

THE DRYLAND FARMERS' ADAPTATION BEHAVIOUR AND BARRIERS FACED ON PRACTICING ADAPTATION STRATEGIES IN AGRICULTURE TOWARDS CLIMATE CHANGE

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ABSTRACT

Drylands are negatively affected by climate change. Climate change decrease the farmers' income because of variation in its existence. Adaptation is defined as one of the option to reduce the negative impact of climate change. The purpose of the study is to analyze the adaptation behavior of dry land farmers to climate change and the barriers faced by the dry land farmers while taking adaptation measures to climate change. The study was based on the interview of 100 dry land farmers from five villages. Thus the study identified the adaptation techniques employed by the farmers and the barriers faced by them while practicing it. The study revealed that medium level of the dry land farmers have changed their crop management practices and involved in subsidiaries activities as an adaptation measures and also it was found that most of the dry land farmers affected by the cost of inputs, labour shortage, lack of information about climate change etc.

KEYWORDS: Dryland Farmers, Adaptation, Barriers & Climate Change

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INTRODUCTION

Adaptation is widely recognized as a vital component of policy response to climate change. It is the way of reducing vulnerability, increasing resilience, moderating the risk of climate impacts on lives and livelihoods. Common adaptation methods in agriculture include use of new crop varieties and livestock species that are better suited to drier conditions, irrigation, crop diversification, adaptation of mixed crop and livestock farming systems, and changing planting dates, using different crop varieties, changing planting and harvesting dates, increased use of water and soil conservation techniques, and diversifying from farm to non-farm activities to cope up with climate change (Anonymous 2006, Nhemachena and Hassan, 2007). Some measures may be taken at the individual or farm level, others require collective action (rainwater harvesting) or investments at the agency or government level for example, building dams, releasing new cultivars that are more water efficient (Jawahar and Msangi, 2006). Based on these issues the study was conducted to analyze the adaptation measures initiated by the dry land farmers against climate change.

The constraints faced by the dry land farmers while taking adaptation towards climate change were in huge. Rationing of inputs, and lack of seed inputs are important constraints for most farmers (Nhemachena and Hassan, 2007). Lack of access to credit, lack of information or knowledge of appropriate adaptation measures, poverty and lack of savings were the main barriers to adaptation (Gbetibouo and Ringler, 2009). Shortage of labour, poor access to market, were also considered as the main problem by the dry land farmers (Onyeneke *et al.*

2010) Lack of capital, and lack of water resources and inefficient extension services were reported as problem by Nigeria farmers (Sofoluwe *et al.*, 2011). Based on these issues the study was developed to identify the barriers while adapting the measures against the climate change.

METHODOLOGY

Tirunelveli district of Tamil Nadu was selected as the study area. Kuruvikulam panchayat union of Sankarankovil taluk was selected due to climatic variations and its existence. Among 25 panchayat villages of union, 5 villages were used for the research. 100 respondents were selected through the Snow ball sampling method. A well structured interview was prepared with pre testing utilized for this study.

FINDINGS AND DISCUSSION

Agriculture which is mainly affected by climate change since from many years, in order to run life, the farmers were taking many alternative strategies to manage the ill effects of climate change. In this study the farmers were taking the strategies like alternation in their management practices and involved in subsidiary activities to cope with climatic conditions. The results were depicted in the table 1 and 2.

Table 1: Adaptation Measures in Response to Changes in Management Practices

(n = 100)

S. No	Management Practices	Before 2000			After 2000		
		I (%)	D (%)	NC (%)	I (%)	D (%)	NC (%)
1.	Spacing between the rows/plants	-		100.00	87.00	-	13.00
2.	Quantity of seeds used	14.00		86.00	-	78.00	22.00
3.	Quantity of fertilizer application	-	16.00	84.00	80.00	-	20.00
4.	Number of irrigations given	-	41.00	59.00	100.00	-	-
5.	Quantity of weedicide application	13.00		87.00	61.00	39.00	-
6.	Quantity of pesticide application	16.00		84.00	65.00	35.00	-
7.	Adjusting harvesting time	-	-	100.00	73.00	27.00	-
8.	Storing / Post harvesting adjusting period		12.00	88.00	80.00	-	20.00

I – Increased: D - Decreased: NC- No Change

Before 2000, almost all farmers had no variation on spacing and adjustment in harvesting time. Nearly 88.00 per cent of farmers expressed that there was no adjustment in their storing and post harvesting period. A little more than 85.00 per cent of farmers declared that there were no difference in the quantity of seeds and weedicide application respectively. Likewise, there was no change in the quantity of fertilizer and pesticide usage by 84.00 per cent of farmers.

After 2000, Majority of farmers (87.00 %) were stated that spacing between the crop had increased followed by 80.00 per cent of farmers indicated that there was an increase in usage of fertilizers, time of storage and post-harvest. A little less than three - fourth (73.00 %) of respondents pointed out that the harvesting time has increased. More than half of the farmers (61.00 % and 65.00 %) confirmed that increase in the quantity of weedicides and pesticides respectively. This finding is strengthened by the findings of Kaur (2012) who conducted research on privatization of extension services and reported the same.

Subsidiary Activities Initiated Due to Climate Change

Due to climate change dryland farmers were decided to do other subsidiary activities to increase their income for their lives. The data were analyzed and resulted in the Table 2.

**Table 2: Subsidiary Activities Initiated Due to Climate Change
(n = 100)**

S. No	Subsidiary Activities	Percentage
1.	Village merchant	43.00
2.	Dairy + goat + poultry	16.00
3.	Matchbox industry	14.00
4.	Weaving	8.00
5.	Mason	13.00

The majority of farmers (43.00 %) had acted as village merchants subsidiary activities in their surrounding areas. Similarly 16.00 percent of farmers were rearing the combination of dairy, goat, poultry followed by 14.00 per cent of farmers engaged in match box manufacturing besides 13.00 per cent performed as mason. Likewise 8.00 per cent of respondents were worked in weaving industries as a daily wagers. This finding is in line with the findings of Gowda (2015).

Barriers faced by the respondents while taking adapting measures to climate change were also studied and results are presented in the Table 3

**Table 3: Barriers Faced by the Respondents while Taking Adapting Measures to Climate Change
(n = 100)**

S. No	Constraints	Percentage
1.	Difficult to work in the field due to sever temperature	72.00
2.	Higher cost of the agricultural inputs	100.00
3.	Non availability of timely inputs (seeds, pp chemicals, fertilizers etc)	100.00
4.	Low price for the produce in the market	70.00
5	Non availability of laborers	100.00
6	Higher wage rate for laborers	100.00
7	Poor supply of uniform electricity	100.00
8.	Lack of information about long term climate change	29.00
10.	Lack of knowledge regarding appropriate adaptations	23.00
11	Lack of credit/ loan from the banks	80.00
13	Lack of knowledge on (Post Harvest Technology)	12.00

Most of the constraints challenged by the farmers were high cost of inputs, non-availability of timely inputs, non-availability of labors, high wage for labors and poor supply of electricity valued as major constraints in the study area. Because of the price of fluctuation the cost of inputs has increased day by day which leads to non-availability of timely inputs. Rural people were migrated to urban areas due to various reasons like climatic disasters, job, education etc. leads to labor scarcity. Because of labor scarcity, wages for labor were also increased. NREGA program is another important reason for labour problem because it was providing enough wage to rural people with minimal work compare to agricultural works.

Majority of 80.00 per cent of the farmers revealed that lack of credit / loan from the banks as major determinants for their cropping choices in turn affecting the production levels. It also leads to reduce the initiation of new adaptation strategies to mitigate the ill effects of climate change.

More than 70.00 per cent of respondents were expressed that it was difficult to work in the field to severe temperature. Because of dramatic change in the climate which leads to great effect in the agriculture and farmers.

Nearly 29.00 per cent of the farmers declared that lack of information about any long term climate change as constraints in the study area. They were modified to climatic conditions with their experience and also conscious through the mass media. So it is not the major constraints among the respondents but they expects the State Department Officials should provide the information on the adaptation measures.

A little less than 25.00 per cent of the respondents revealed that the Lack of knowledge regarding appropriate adaptations in the study area. Adaptation measures with the knowledge of experienced farmers, but the initiation and maintenance of the measures are difficult because of it cost. They involved in subsidiary activities based on their own aspects to increase their standard of living.

Only 12.00 per cent of respondents expressed that lack of knowledge on post harvest technology because most of the dry land farmers in the study area were directly marketed to commission mandies.

CONCLUSIONS

In this study most of the farmers expressed that there was no change in their management practices before 2000. After 2000 more than 80.00 per cent of the farmers increased their spacing between the crops, application of fertilizer and adjustment in their harvesting period. Nearly more than 60.00 per cent of the farmers were increased the quantity of chemicals used in their crop production. Similarly to overcome the effect of climate change they were involved in subsidiary activities for their additional income. Most of the farmers (43.00 %) were acted as village merchant and more than 10.00 per cent of the farmers were involved in match box industries, weaving industries, also working as mason. After completing their agricultural works they were moved to nearby towns for these subsidiary activities to improve their standard of living. The high cost of inputs, labour shortage, non availability of inputs, poor electricity, lack of credit were considered as barriers while adapting the measures against the climate change. They had the knowledge about the climate change and adaptive measures with the help of their experience, contact with the innovative farmers and exposure to mass media and also they expect the State Government to ensure the early warning system about the climate change. Ill effects of climate change has been increased in recent days. It is the government and policy maker's inevitable duty to mitigate such kind of impacts in agriculture and strengthen the farmers' livelihood.

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